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Filed : November 13, 2003
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Attorney's Docket No.: 12732-176001 / US6730/6731

Amendments to the Drawings:

The attached replacement sheets of drawings includes changes to Figs. 9, 13A, 13B and 17 and replaces the original sheet including Figs. 9, 13A, 13B and 17.

Figures 9, 13A, 13B and 17 have been amended to be designated as prior art.

Attachments following last page of this Amendment:

> Replacement Sheet (3 pages).
> Annotated Sheet Showing Change (3 pages).

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REMARKS

In response to the non-final office action of June 1, 2005, applicants asks that all claims be allowed in view of following remarks. Claims 1-44 are now pending, of which claims 1, 2, 13, 20, 21 and 32 are independent.

Drawings

Figures 9, 13A, 13B and 17 were required by the Office action to be designated as prior art. The drawings have been amended in compliance with 37 C.F.R. § 1.121(d). As such, applicant respectfully requests withdrawal of the objection to the drawings.

Provisional Non-Statutory Double Patenting Rejections

Claims 1-44 have been provisionally rejected as obvious over claims 1-16 of applicant's co-pending Application No. 10/118,917 in view of U.S. Patent No. 6,339,422 (Kuwajima). Without conceding obviousness, applicant respectfully requests that this provisional rejection be held in abeyance until the claims of both this application and those in Application No. 10/118,917 are otherwise held to be allowable.

Claims 1-44 also have been provisionally rejected as obvious over claims 1-26 of applicant's co-pending Application No. 10/385,712 in view of Kuwajima. Without conceding obviousness, applicant respectfully requests that these provisional rejections be held in abeyance until the claims of both this application and those in Application No. 10/385,712 are otherwise held to be allowable.

Rejection under Section 103

Claims 1-44 were rejected under 35 U.S.C. § 103 as being unpatentable over Shigeta (U.S. Patent No. 6,088,012) in view of Kuwajima. Applicant requests reconsideration and withdrawal of the rejection because Shigeta, Kuwajima or any proper combination of the references do not describe or suggest the subject matter of independent claims 1, 2, 13, 20, 21 and 32.

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Independent Claims 1, 2, 20 and 21 and Dependent Claims 3-12 and 22-31

Claim 1 recites a display device that includes a display and a display controller. The display device also includes a first means that divides one frame period into a subframe periods, sets one of lighting and non-lighting to each of the plurality of subframe periods, and expresses n-bits gradation (where n is a natural number of two or more) in accordance with a total lighting time during the one frame period. The display device also includes a second means that does not divide one frame period into subframe periods, that sets one of lighting and non-lighting to the one frame period, that expresses 1-bit gradation in accordance with a total lighting time during the one frame period, and that operates the display with a lower clock frequency and a lower driving voltage than the first means. The display controller controls the first means and the second means. Each of independent claims 2, 20 and 21 recites similar features.

Applicant requests reconsideration and withdrawal of this rejection because Shigeta does not describe or suggest dividing one frame period into subframe periods and setting one of lighting and non-lighting to each of the subframe periods, for expressing n-bits graduation, where n is a natural number of two or more, in accordance with a total lighting time during the one frame period and not dividing one frame period into subframe periods, for setting one of lighting and non-lighting to the one frame period, for expressing 1-bit gradation in accordance with a total lighting time during the one frame period, as recited in independent claims 1, 2, 20 and 21.

With regard to claims 1-44, the Office action asserts that Shigeta teaches:

a first means for dividing a first frame period into a plurality of·subframe periods that one of lighting and non-lighting is set to each of the subframe periods and expressing graduation in accordance with a total lighting time during a frame period of a first display mode (e.g., 12 bits), and **a second means for setting less gradation during a frame period of a second mode** (e.g., 8 bits).

Office action of June 1, 2005 at page 5, lines 15-21 (citing Figs. 1-2, 12, and 13; col. 1, lines 13-36; col. 4, lines 12-45; col. 6, lines 24-68; and col. 7, lines 1-65) (emphasis added). Applicant respectfully disagrees that Shigeta, in the cited portions or anywhere else, teaches a second means for setting less gradation during a frame period of a second

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mode. Nor does Shigeta disclose a frame period that is not divided into subframe periods, as required by independent claims 1, 2, 20 and 21.

Shigeta describes techniques in which pixel data of 8 bits and pixel data of 12 bits express the same gradation. In Shigeta's 8-bit pixel data format, each bit corresponds to one of eight subframes SF0 to SF7, respectively. See Shigeta at Fig. 12 (showing a light emitting format of subframes corresponding to eight bits in one frame). In Shigeta's 12-bit pixel data format, each bit corresponds to one of twelve subframes SF0 to SF7b, respectively. See Shigeta at Fig. 13 (showing a light emitting format of subframes corresponding to twelve bits in one frame). Notably, Shigeta discloses techniques for converting the pixel data of 8 bits into pixel data of 12 bits. More particularly, Shigeta discloses a pixel data converting circuit in Figure 3 that converts 8-bit pixel data to 12-bit pixel data "of the corresponding luminance level." See Shigeta at col. 5, lines 49-52. See also Shigeta at col. 4, lines 11-29; col. 5, line 45 to col. 6, line 13; and Figs. 2-3. As such, Shigeta's pixel data of 8 bits and pixel data of 12 bits express the same gradation. Hence, Shigeta does not describe or suggest "a second means for setting less gradation during a frame period of a second mode (e.g., 8 bits)," as asserted by the Office action.

Accordingly, Shigeta necessarily does not describe or suggest a second means that expresses 1-bit graduation in accordance with a total lighting time during the one frame period, as recited in independent claims 1, 2, 20 and 21.

Nor does Shigeta disclose a frame that does not include subframes. As such, Shigeta necessarily cannot disclose a second means (or a second display mode) that does not divide one frame period into subframe periods, that sets one of lighting and non-lighting to the one frame period, and that expresses 1-bit gradation in accordance with a total lighting time during the one frame period, as recited in independent claims 1, 2, 20 and 21.

Kuwajima does not remedy the failure of Shigeta to describe or suggest the subject matter of independent claims 1, 2, 20 and 21. Rather, Kuwajima discloses techniques for dividing the frequency of the clock signal to be provided to a display circuit that controls a display device. See, e.g., Kuwajima at col. 4, lines 39-60 and Figs. 2-3. As such, Kuwajima

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does not describe or suggest dividing one frame period into subframes, much less doing so in the manner recited in independent claims 1, 2, 20 and 21. Nor does Kuwajima describe or suggest setting one of lighting and non-lighting to the one frame period or expressing gradation in accordance with a total lighting time during the one frame period, as recited in claims 1, 2, 20 and 21.

Accordingly, neither Shigeta, Kuwajima, nor any proper combination of the references describes or suggests a first means or display mode that divides one frame period into subframe periods, sets one of lighting and non-lighting to each of subframe periods, and expresses n-bits graduation, where n is a natural number of two or more, in accordance with a total lighting time during the one frame period and a second means or display mode that does not divide one frame period into subframe periods, sets one of lighting and non-lighting to the one frame period, and expresses 1-bit graduation in accordance with a total lighting time during the one frame period, as recited in independent claims 1, 2, 20 and 21. Applicant therefore submits that the Office action has not properly made a prima facie case of obviousness.

For at least these reasons, applicant requests reconsideration and withdrawal of the rejection of claims 1, 2, 20 and 21 and their dependent claims 3-12 and 22-31.

Independent Claims 13 and 32 and Dependent Claims 14-19 and 33-44

Each of independent claims 13 and 32 recites dividing one frame period into a plurality of subframe periods, setting one of lighting and non-lighting to each of the subframe periods, and expressing n-bits gradation (where n is a natural number of two or more) in accordance with a total lighting time during the one frame period. Each of claims 13 and 32 also recites dividing one frame period into subframe periods and setting one of lighting and non-lighting to each of the subframe periods, for expressing m-bits gradation (where m is a natural number less than n) in accordance with a total lighting time during the one frame period, and for operating the display at a lower clock frequency and a lower driving voltage than the first means.

As noted above with respect to claims 1, 2, 20 and 21, Shigeta describes techniques in which pixel data of 8 bits and pixel data of 12 bits express the same gradation. As such, Shigeta does not describe or suggest "a second means for setting less

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gradation during a frame period of a second mode (e.g., 8 bits)," as asserted by the Office action.

Accordingly, Shigeta does not describe or suggest expressing n-bits gradation (where n is a natural number of two or more) in accordance with a total lighting time during the one frame period and expressing m-bits gradation (where m is a natural number less than n) in accordance with a total lighting time during the one frame period, as recited by claims 13 and 32.

For the reasons noted above with respect to claims 1, 2, 20 and 21, Kuwajima does not remedy the failure of Shigeta to describe or suggest the subject matter of independent claims 13 and 32. Accordingly, neither Shigeta, Kuwajima, nor any proper combination of the references describes or suggests the subject matter of independent claims 13 and 32.

For at least these reasons, applicant requests reconsideration and withdrawal of the rejection of claims 13 and 32 along with their respective dependent claims 14-19 and 33-44.

Conclusion

It is believed that all of the pending issues have been addressed. However, the absence of a reply to a specific rejection, issue or comment does not signify agreement with or concession of that rejection, issue or comment. In addition, because the arguments made above may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this reply should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this reply, and the amendment of any claim does not necessarily signify concession of unpatentability of the claim prior to its amendment.

Applicant submits that all claims are in condition for allowance.

Pursuant to 37 CFR §1.136, applicant hereby petitions that the period for response to the action dated June 1, 2005, be extended for one month to and including October 1, 2005.

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Enclosed is a check in the amount of $120.00 for the Petition for Extension of Time fee.

Please apply any other charges or credits to deposit account 06-1050.

Respectfully submitted,

Date: September 29, 2005

Barbara A Benoit

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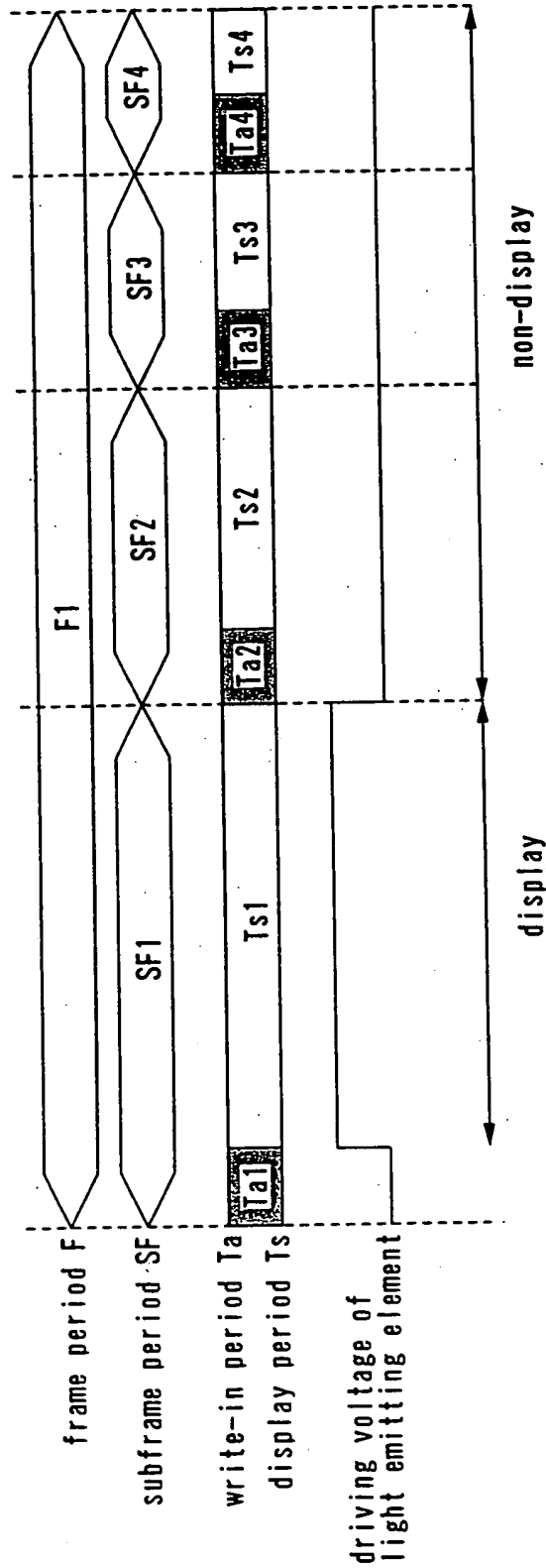Facsimile: (202) 783-2331
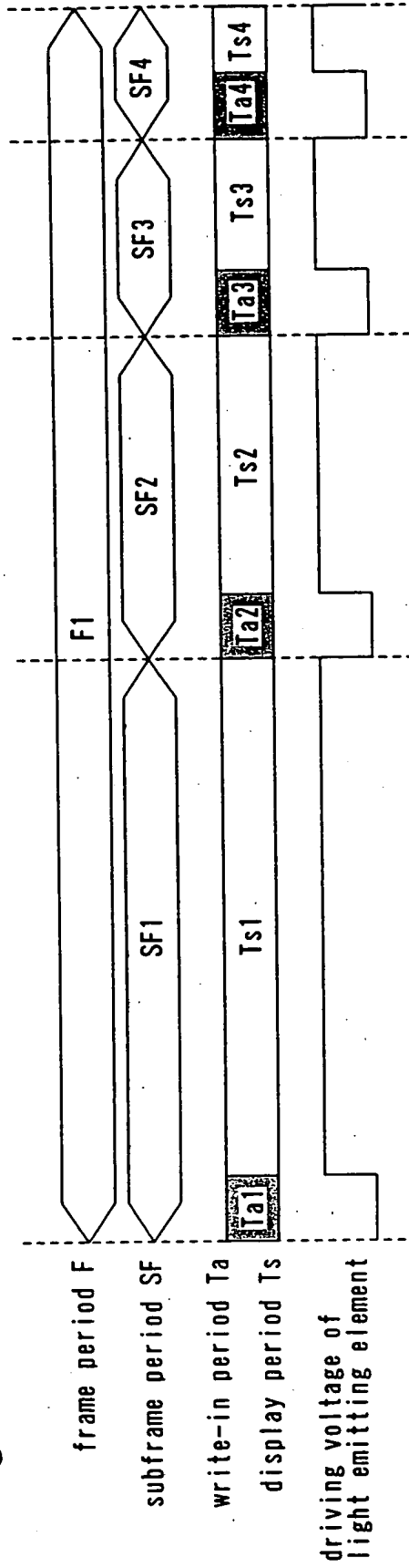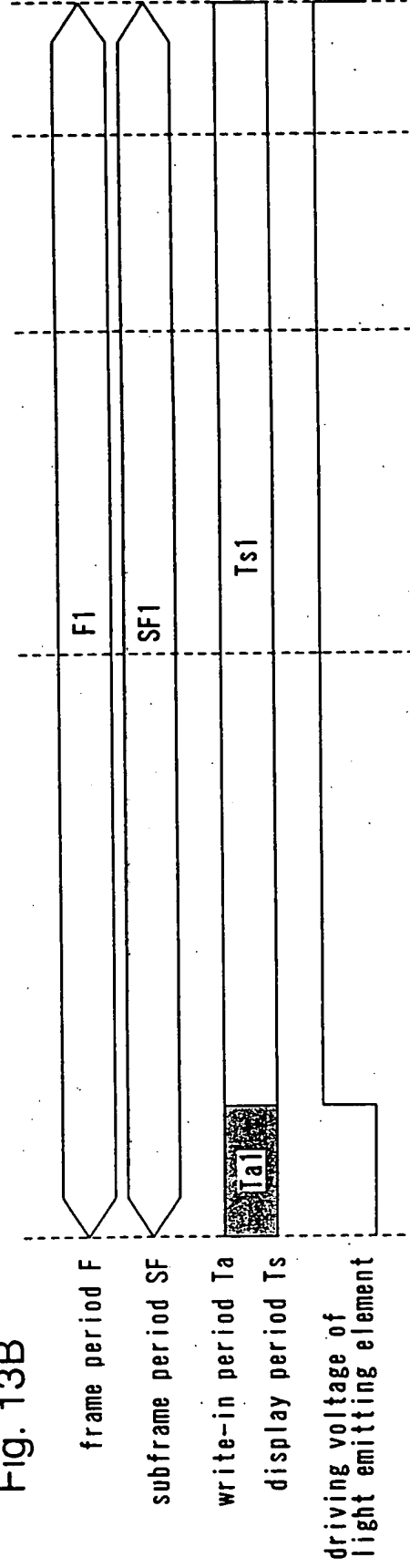
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Fig. 9

DRior ART

PRIOR ART

Fig. 13A

frame period F

subframe period SF

write-in period Ta

display period Ts

driving voltage of
light emitting element

F1

SF1 | SF2 | SF3 | SF4

Ta1 | Ts1 | Ta2 | Ts2 | Ta3 | Ts3 | Ta4 | Ts4

Fig. 13B

PRIOR ART

frame period F

subframe period SF

write-in period Ta

display period Ts

driving voltage of
light emitting element

F1

SF1

Ta1 | Ts1

Fig. 17 PRiOR ART